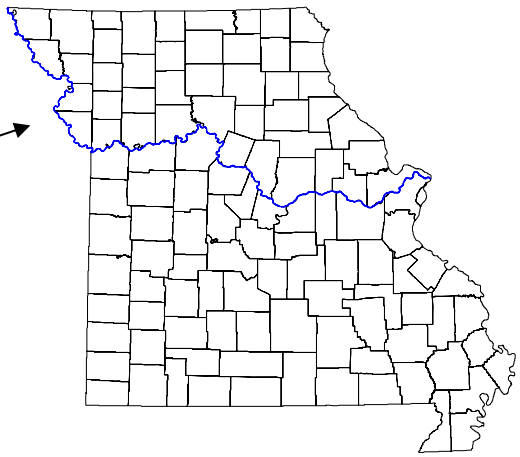
Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Missouri River

Waterbody Segment at a Glance:

Counties: Twenty-five counties
Nearby Cities: Numerous cities and towns
Length of impairment: 533 miles (highlighted on map)
Pollutant: Chlordane and Polychlorinated Biphenyls (PCBs) in fish
Source: Many point/non-point sources



TMDL Priority Ranking: High

Description of the Problem

Beneficial uses of Missouri River

- Livestock and Wildlife Watering
- Protection of Aquatic Life and Human Health – Fish Consumption
- Whole Body Contact, Category B
- Secondary Contact Recreation
- Irrigation
- Drinking Water Supply
- Industrial

Use that is impaired

Protection of Human Health - Fish Consumption

Standards that apply

- The action level for Chlordane in fish tissue, established by the U.S. Food and Drug Administration (FDA) is 0.3 milligrams per kilogram (mg/kg) or parts per million (ppm).
- The FDA sets a 2.0 mg/kg limit on interstate shipment of fish for human consumption. The U.S. Environmental Protection Agency sets a human health screening level of 0.01 mg/kg on PCBs in fish.

Background information and Water Quality Data

Prior to 2001, the Missouri Department of Health and Senior Services maintained a fish consumption advisory on all waters in the state outside the Ozark Plateau. This advisory, which included the Missouri and Mississippi Rivers, recommended consumption of no more than one meal per week of carp, catfish, buffalo, drum, sucker or paddlefish due to chlorinated hydrocarbon pesticides such as Dieldrin, Chlordane and DDT. The Department of Health and Senior Services lifted this advisory in 2001 due to declining levels of these chemicals in most fish species. The current advisory (2004) replaced the lifted advisory for the Missouri and Mississippi Rivers. This advisory recommends that no sturgeon or sturgeon eggs should be eaten due to elevated levels of Chlordane and PCBs.

Chlordane is a pesticide that was commonly used in the past for termite control. It was also used at nurseries, on golf courses and in agriculture. Chlordane was banned for agricultural use in 1975 and for all uses in 1988, but (due to its persistence) eroding contaminated soil can provide a continuing source of Chlordane to streams and lakes. PCBs are a mixture of up to 200 different chlorinated compounds and are stable under conditions of high pressure and high temperature. PCBs were commonly used in transformers and other electrical equipment such as fluorescent light fixtures as coolants and lubricants and were also used as hydraulic oils. U.S. production ended in 1977 due to concerns about the persistence of PCBs in the environment. Chlordane and PCBs degrade very slowly and bio-accumulate in fish tissue, particularly in bottom-dwelling/feeding fish. Table 1 below gives information on the levels of these two chemicals in sturgeon in the Missouri River within or where it borders the State of Missouri.

Table 1. Average Annual Levels of Chlordane and PCBs (in mg/kg) of All Samples in the Missouri River Within or Bordering the State of Missouri.

Year*	Number of Fish in Sample**	Number of Samples collected	Missouri River Average of all sampling sites	
			Chlordane (Standard 0.3)	PCBs (Standard 0.01)
1997	51	5	3.0060	2.2776
1998	40	2	1.6225	1.2250
1999	40	4	2.2063	0.8231
2000	5/61	1/ 5	0.9000	0.4335
2001	15	3	2.9400	2.0300
2002	58	3	No sample	0.9390
2004	92	25	No sample	2.5139

*Data may be from different locations within a given year and between years.
**The first number is the number of fish or samples collected for Chlordane the second number for PCBs

The department recognizes that data collected to date does not always reflect a downward trend of PCBs or Chlordane on a year-to-year basis. However, this is most likely due to collection inconsistencies. Some years of data contain tissue samples of many different fish species but some years contain only one or two species of fish. Fatty fish, such as carp, tend to absorb more PCBs than a less fatty fish such as catfish. Likewise, feeding habits, rainfall and age and size of the fish can effect the amount of sediment (thus PCBs and Chlordane) assimilated by fish or the bio-accumulative effect. The most recent data predominately sampled catfish and sturgeon, however in 2004, only sturgeon was sampled. This would tend to show increasing levels of PCBs and Chlordane in later years and obscure the overall downward trend.

As mentioned, these pollutants degrade slowly and are extremely persistent in the environment. However, since they are no longer produced, a downward trend is inevitable and the department recommends the development of a consistent protocol for measurement of the pollutants in fish tissue and continued sampling.

For more information call or write:

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102-0176
Office 1-800-361-4827 or (573) 751-1300
Fax (573) 522-9920
Program Home Page: www.dnr.mo.gov/env/wpp/index.html